

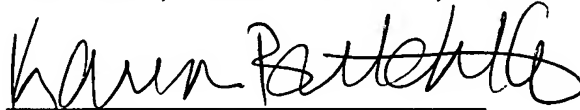
REMARKS

Claims 1-13 have been amended, and claims 14-17 have been added.

Examination of the application is requested. No additional fees are seen to be required. If any additional fees are due, however, the Commissioner is authorized to charge Deposit Account No. 50-1482, in the name of Carlson, Gaskey & Olds, P.C., for any additional fees or credit the account for any overpayment.

Respectfully Submitted,

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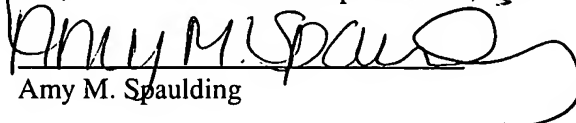
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Dated: September 14, 2005

CERTIFICATE OF MAIL

I hereby certify that the enclosed preliminary amendment is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Mail Stop – PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 14, 2005.



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10/525497

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A BALANCE WEIGHT, A WHEEL, A WHEEL RIM AND A WHEEL DISC

REFERENCE TO RELATED APPLICATIONS

- [1] This application claims priority to PCT Application PCT/BR2003/000092 filed on July 10, 2003, which claims priority to Brazilian Patent Application PI0203372-0 filed on August 23, 2002.

BACKGROUND OF THE INVENTION

- [2] The present invention relates to a wheel-balance weight for use on a vehicle wheel, ~~a of an automobile vehicle. The wheel is made from stamped steel especially for use on an automotive vehicle, the wheel being provided with means to fix and includes a feature that fixes the weigh for a dynamic balancing of weight to dynamically balance the wheel-tire assembly, as well as.~~ The present invention also relates to a wheel rim and a wheel disc thus configured with the weight. ~~Description of the Prior Art~~
- [3] ~~The conventional~~ Conventional wheels made from stamped steel ~~are composed of include~~ a wheel rim for fixing a tire and a wheel disc, ~~the rim accounting for fixing the tire and comprising, at its.~~ An end, of the wheel rim includes a protuberant flange. In an alternative embodiment, the wheel from stamped steel ~~comprises~~ includes a flange that is an integral part of the disc. ~~These~~ The protuberant flanges are substantially perpendicular to the rest of the body and have a substantially "J" or "J" shaped curved profile.
- [4] The flange enables ~~one to place the~~ a wheel weight, ~~the function of which is to balance to be fixed to the wheel rim. The weight dynamically balances the wheel-tire assembly dynamically, in order to prevent trepidation of a moving vehicle, particularly at a high speed, as a result of an unbalancing. The balance weight is basically constituted by made of a metal, more usually by of a high-density lead or another metal, from which a.~~ A substantially U-shaped clamp projects with that has a first end fixed to the metal body and a second end being that is free to cooperate with the flange, as will be described later.
- [5] ~~In order to fix the~~ The wheel weight, ~~it is positioned in a way to force its movement against the wheel, so that the~~ fixing the wheel weight. An opening of the U-shaped clamp ~~will permit~~ permits cooperation with ~~the~~ a free end of the flange. As the

weight is pressed against the wheel, the clamp gradually opens until the metal body touches the an inner surface of the flange. The clamp tends to return to its natural shape, thus applying a force onto the tip of the flange, and generating a normal force, maximizing the to maximize friction between the clamp and the flange tip, maintaining. This stabilizes the weight stable in its position, even when rotational movement of the wheel occurs.

[6] In ~~the case of~~ painted wheels, the friction provided by the U-shaped clamp is sufficient to maintain the weight in its position, even if the vehicle travels at high speeds or on rough roads ~~having imperfections~~. A drawback ~~of the~~ to painted wheels is that, with the friction caused by the U-shaped clamp, the paining paint at the place location of friction is damaged, from the moment of its installation, thus causing financial losses to the user if, ~~for instance~~, he wants to sell the wheels in the near future, ~~rust and devaluation of the vehicle~~. This also causes rusting of the wheel.

[7] On the other hand, ~~the~~ wheels made of stamped steel have the drawback of being aesthetically little attractive, being little and are not often used on luxury vehicles. ~~With a view to~~ To solve this problem, ~~the wheel of a~~ stamped steel wheel has been developed with having a chromed finishing, which provides a more attractive ~~visual effect~~, making visually, making it commercially more acceptable. However, ~~this~~ the chromed finishing ~~causes a drop in~~ reduces the friction-coefficient of friction of the flange surface, at the location where the clamp of the balance weight is fixed. ~~The~~ As a result of the reduction in the friction-coefficient of friction, ~~causes the resultant friction force not to be~~ is not sufficient ~~for keeping to keep~~ the weight in the desired position, even if the installation is correct. ~~The chances of~~ This increases the chance that the balance weight ~~to detach may detach~~ from the wheel when the vehicle is traveling on a rough road ~~having deformations are much higher, bringing~~ which is a great drawback for ~~the~~ those who use this type of wheel.

[8] ~~US Pat.~~ United States Patent No. 6,238,006 discloses ~~an attempt at eliminating these drawbacks, by disclosing a wheel provided with~~ that includes a recess ~~for retaining the that retains a balance weight and that overcomes these drawbacks. This~~ The recess ~~comprises~~ includes a shoulder that ~~serves~~ functions as stop for projecting the balancing clamp, so that both of them will function as a lock.

- [9] Although this embodiment eliminates the mentioned drawbacks, it needs a specific balance weight, ~~the~~. ~~The clamp of which is provided with~~includes a projection ~~for locking it close~~that locks the weight near to the wheel, ~~which renders~~rendering its use and/or installation less attractive.
- [10] Another solution is proposed in ~~US Pat.~~United States Patent No. 5,733,016, which discloses a balance weight assembly on vehicle wheels, ~~wherein the~~. ~~The wheel comprises~~includes a flange ~~provided with~~having a concave recess and a balance weight ~~provided with~~having a U-shaped curvature at ~~the~~a free end of ~~the~~a clamp, ~~which enables one to fit~~. This allows the clamp to fit into the recess, so that it will be steadily fixed to the wheel. However, this embodiment still has the above-cited drawbacks.
- [11] Another drawback in the ~~present embodiment of~~prior balance weights is the massive ~~utilization~~use of lead in manufacturing ~~them~~. Lead is a heavy metal, which ~~causes~~can possibly cause diseases such as cancer ~~and~~. It is also an active environmental pollutant, so ~~that the use thereof has~~as already been discussed. In this regard, the European Community Committee has established a time limit for the ~~manufacturer of~~discontinued use of balance weight ~~to discontinue the use~~weights made of lead, mainly because the manufacturing process ~~of making it is a polluting element~~polluting. For new vehicles ~~having an already advanced project~~, the time limit is July 1st, 2003, ~~and for maintaining the~~. For vehicles already in circulation, the time limit is July 1st, 2005. In view of the time limits already approved by the European Parliament, ~~the~~ companies that make balance weights should ~~bear in mind~~be mindful of projects that exclude lead from the manufacture of balance weights.
- [12] In addition, ~~with the passing of~~over time, the clamp that secures the balance weight ~~close to~~near the wheel may ~~undergo corrosion~~corrode and detach. As a result, the user will have to ~~resort to~~use companies ~~specializing~~that specialize in balancing to balance the wheels, since the installation of ~~said~~the balance weight needs tools and skilled labor to carry out the service, ~~thus~~ causing a cost-and-time drawback.
- [13] In addition to the functional drawbacks, the balance weight has ~~the~~an unfavorable esthetic factor. The ~~usual coloration of the~~ balance weight ~~is that of its~~usually has the same color as the constituent material, ~~thus being and is~~ different from the ~~that~~color of the wheel, ~~causing a little attractive~~providing an unattractive contrast with the vehicle.

Besides, as already stated, ~~it~~the wheel damages the paint of the wheel on which it is installed due to the friction between ~~it~~the wheel and the flange.

Objectives of the Invention

SUMMARY OF THE INVENTION

[14] A first objective of the present invention is to provide a magnetic balance weight for ~~the dynamic balancing of~~dynamically balancing vehicle wheels. A second objective of the present invention is to provide a wheel having meansa feature for fitting the balance weight ~~of the invention~~. A third objective of the present invention ~~it~~is to provide a wheel disc for use on ~~the above mentioneda~~ wheel and having meansa feature for fitting the balance weight ~~of the invention~~. A fourth objective of the present invention is to provide a wheel rim for use on ~~the above mentioneda~~ wheel and having meansa feature for fitting the balance weight ~~of the invention~~. ~~Brief Description of the Invention~~

[15] The first objective of the present invention is achieved by ~~means of~~ a balance weight, especially for use on automotive vehicles, ~~comprising~~including at least one body and at least one magnetic element.

[16] The second objective of the invention is achieved by ~~means of~~ a wheel, especially for use on automotive vehicles, provided with an associated rim and disc, ~~comprising and including~~ an end region ~~that has~~having a free end, ~~the~~. The end region ~~having~~has a cavity for association with a balance weight ~~as defined above~~.

[17] The third objective of the present invention is achieved by ~~means of~~ a wheel rim, especially for use on a wheel of automotive vehicles, ~~comprising~~including an end region ~~that has~~having a free end, ~~the~~. The end region ~~having~~has a cavity for association of a balance weight ~~as defined above~~.

[18] The fourth objective of the present invention is achieved by ~~means of~~ a wheel disc, especially for use on a wheel of automotive vehicles, ~~comprising~~including an end region ~~that has~~having a free end, ~~the~~. The end region ~~having~~has a cavity for association of a balance weight ~~as defined above~~.

[19] The invention has ~~the following~~many advantages, ~~among others~~. For one, the balance weight of the magnetic wheel does not have clamps, ~~which that can~~ damage the paint of the wheel and may become loose and drop. Additionally, specific tools are not needed for the installation of the balance weight ~~does not need the use of specific tools~~,

~~thus being making installation easier and less expensive; the.~~ The present invention also favors the use of wheels having a surface finish with different degrees of rugosity, including a reduced rugosity, without ~~less in losing the capacity of fixing ability to fix~~ the balance weight to the wheel; ~~still in the area of aesthetics, the.~~ The balance weight may preferably be painted ~~in same the color of as~~ the wheel, which "camouflages" it; ~~the.~~ The balance weights of the present invention may be installed either in ~~the~~ a groove or at any other point on the wheel, ~~for instance such as~~ on the inside of the disc, since they are magnetic; ~~the.~~ The weights may also be used on prior art wheels.

Brief Description of the Drawings

BRIEF DESCRIPTION OF THE DRAWINGS

[20] The present invention will now be described in greater detail with reference to an embodiment represented in the drawings. The figures show:

[21] —Figure 1 is a cross-section ~~sectional~~ view of a wheel flange with a balance weight of the prior art being fixed;

[22] —Figure 2 is a cross-section ~~sectional~~ view of ~~the~~ a flange of a wheel that has a cavity for inserting ~~the~~ a magnetic balance weight of the present invention;

[23] —Figure 3 is a cross-section ~~sectional~~ view of the wheel illustrated in ~~figure~~ Figure 2 with the magnetic balance weight ~~of the invention~~ fixed to it;

[24] —Figure 4 is a cross-section ~~sectional~~ view of the flange of a wheel ~~from of~~ the prior art ~~with including~~ a first alternative embodiment of the magnetic balance weight ~~of the present invention~~; and

[25] —Figure 5 is a cross-section ~~sectional~~ view of the flange of the wheel ~~from of~~ the prior art ~~with including~~ a second alternative embodiment of the magnetic balance weight ~~of the present invention~~.

Detailed Description of the Figures

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[26] According to a preferred embodiment and as can be seen in ~~figure~~ Figure 2, the wheel of the present invention ~~comprises~~ includes a cylindrical wheel rim and a substantially circular wheel disc associated to each other.

[27] The wheel rim ~~is provided with~~ includes at least one end region ~~1~~, called a flange 1, which is protuberant and constitutes a region of maximum diameter of the wheel. The

flange 1 has a free end 7 and a body 2, the free end 7 projecting substantially parallel from the body 2 ~~substantially parallel to it, and~~ defining a substantially "J" or "J" shaped profile. Usually, the wheel ~~rim has~~ rim has two flanges 1, located at their two ends, ~~so that~~ and both of them the flanges 1 enable one to fix and position a tire (not shown) onto the wheel.

[28] Optionally, ~~one may obtain a~~ the wheel with includes a rim that defines one of the flanges 1, and the disc defines the other flange 1, ~~so that, when.~~ When these components are associated to each other, the functional result is similar to that achieved by the wheel that ~~comprises~~ includes the two flanges 1.

[29] The two wheel flanges 1 and the rest of the rim wall or disc wall, ~~as the case may be,~~ define a groove in which ~~the~~ a tire is placed, ~~so that it~~ and the side wall 7 near an ~~close to the~~ opening, usually known as a bead, is propped by the flanges 1. When the tire is inflated, the force exerted by it and resulting from the compressed air ~~inside it~~ keeps it the tire positioned, preventing any movement of the bead with respect to the flange 1.

[30] The flange 1 has a cavity 3 that defines a notch for ~~the~~ a balance weight 4, which is used ~~for~~ to dynamically ~~balance~~ balance the wheel-tire assembly, ~~preventing and to prevent~~ trepidation in the vehicle if it is traveling at a high speed as a result of unbalancing.

[31] The cavity 3 is preferably annular, but it may have other shapes or even be segmented. The cavity 3 ~~is provided with~~ includes side walls 3a, which ~~actuate~~ act as latches for the balance weight 4, preventing ~~it~~ the balanced weight 4 from being displaced ~~with~~ during the radial movement of the wheel, and forcing the balance weight 4 to follow its movement. ~~In this way, the~~ The side walls 3a generate a centripetal force that helps the magnetic force to keep ~~it~~ the balance weight 4 correctly installed.

[32] In the preferred embodiment, the cavity 3 has a substantially semicylindrical bottom surface, from which ~~said~~ the side walls 3a project, ~~providing to provide~~ a groove shape.

[33] The balance weight 4 ~~of the present invention has~~ includes two layers, ~~namely: a.~~ A layer 4a, is preferably constituted by made of a metallic material instead of lead, since the use of ~~these~~ balancing weights including lead will be prohibited because lead is a heavy metal that causes ~~damages;~~ damage. A layer 4b, ~~constituted by~~ is made of any

magnetic material, ~~for fixing that fixes~~ the balance weight 4 into the cavity 3.

[34] The balance weight 4 is preferably shaped as an annular segment ~~cooperating that cooperates~~ with the cavity 3. In the preferred embodiment, as can be seen in ~~figures~~Figures 2 and 3, the balance weight 4 is fixed into the cavity 3 by ~~means of a~~magnetic layer 4b, whereby it is secures and secured in a clean and easily usable way.

[35] The cavity 3 ~~guarantees fixation and does not allow~~fixes the balance weight 4 ~~to fall and prevents it from falling out of the cavity 3~~ while the tire is turning, as already mentioned. Alternatively, the cavity 3 may be provided at any ~~place~~location in the wheel, ~~as for example on the inside of the disc, or it may even not exist.~~ Alternately, the tire may not include a cavity 3.

[36] ~~At present, as we can see~~As shown in ~~figure~~Figure 1, the balance weight 400 of the prior art ~~comprises~~includes a clamp 500 and a body 410, preferably but not compulsorily metallic, and the installation of ~~which will be~~is explained below.

[37] The clamp 500 is substantially U-shaped and ~~has~~includes a main edge associated to the metal body 410, a second free end, and an internal wall surface 600 facing the flange 100 ~~of the prior art wheel~~ when the balance weight 400 is associated to it.

[38] In the prior art, ~~the wheel/weight fixation is effected and the balanced weight 400 are fixed by means of the~~ friction of the internal surface 600 of the clamp 500 with the flange 100, ~~since a movement.~~ Movement of the balance weight 400 ~~is causes it to be~~ forced against the flange 100, ~~which causes~~gradually opening the clamp 500 to open gradually when the assembly moves, until the metallic body 410 touches the flange body. This movement causes the clamp 500 to be forced in a forced an open position, ~~tending and it tends~~ to return to its natural shape, ~~whereby when~~ a perpendicular force is applied around the wheel flange surface 100, ~~fixing and keeping to fix and maintain~~ the balance weight 400 in the correct position.

[39] The balance weight 4 of the present invention ~~is intended to eliminate some of~~eliminates the drawbacks ~~existing in~~ the prior art cited above. The friction between the balance weight 400 of the prior art and the flange 1, especially in the installation ~~especially in the case of painted wheels, causes a wear on the paint to wear~~, scratching and damaging it. In ~~this~~the preferred embodiment, the edges of the balance weight 4 are preferably rounded ~~in order~~ to prevent, as much as possible, damage to the paint ~~in the~~

~~contact with~~contacting the cavity 3. The magnetic fixing ~~by means of magnetization~~, besides being ~~an~~ environmentally clean ~~fixation~~, eliminates the need for the clamp 5. The installation of the balance weight 4 becomes more practical, reducing the cost of labor, since there is no need to use specific tools, ~~which enables~~enabling one to install ~~it~~the balance weight 4 more easily and at a reduced cost.

[40] By eliminating the ~~claim~~clamp 5, ~~another drawback in the aesthetics of the wheel is also eliminated, improving the~~the visual aesthetics of the wheel are improved, providing a benefit ~~a requirement which one has been trying to improve more and more lately.~~ Further in the area of aesthetics, the balance weight 4 may preferably be painted ~~in the same color as the wheel, thus "camouflaging" it.~~

[41] The balance weights 4 of the present invention may be installed in the groove or at any other point on the wheel, ~~for instance~~for example inside of the disc.

[42] Evidently, ~~one may conceive~~ any type of wheel can be provided with the cavity 3 ~~configuring that configures~~ a notch for the balance weight 4 with a magnetizable layer 4b. For example, not only wheels composed of a rim and a disc and stamped from steel can not only be used, but also cast wheels, spoked wheels, and wheels made from other materials ~~or any other.~~

[43] ~~The~~In the present invention, ~~enables one to use~~ wheels with a surface finish having different rugosity can be used, including wheels with reduced rugosity. The geometry and thickness of the flange 1 and of the cavity 3 may vary, as well as the size of the balance weight 4, depending upon the size of the wheel to be installed, ~~and even so.~~ Even a wheel configured in this way will continue to be within ~~protection~~the scope of the invention.

[44] This configuration may only be implemented on new wheels that have just come ~~out of~~from the factory. Following the same concept, new alternative configurations of the magnetic wheel weight have been developed, which may be used on any type of wheel, as can be seen in ~~figures~~Figures 4 and 5.

[45] On existing wheels ~~existing on the market and on those~~ that are presently in use, the change and/or placement of the balance weight 400 should be constantly ~~carried out, checked~~ due to the poor conditions of the public ~~ways~~roads. Since ~~the change of it is~~ difficult to change a present wheel into a wheel with a cavity 3 ~~is inaccessible to~~

many consumers, because of the high ~~price thereof~~ cost, a first alternative configuration of a balance weight 40 has been developed, which ~~uses~~ uses the same concept of the balance ~~weight~~ weight 4 disclosed above which can be used ~~for use~~ on present-day wheels. As already said, the present-day balance weight 400 is fixed to the wheel flange 100 by friction, and its fixation reliability is limited. On the other hand, the balance weight 40, as can be seen in ~~figure~~ Figure 4, ~~discloses fixation is fixed by means of the~~ a substantially U-shaped clamp 5, which is substantially U-shaped, with and one of its the ends is fixed to a preferably but not compulsorily metallic body 4c, the latter being provided with. The metallic body 4c includes two layers 4a and 4b. The, the first one layer 4a being constituted by can be made of any material, and the second one layer 4b being constituted by is made of a magnetic material. The balance weight 40 has also includes a second end provided with including an internal wall 6, analogously fixed to the conventional weights at the free end 7 of the flange 1. The existence of the magnetic layer 4b offers the user greater reliability in fixing the balance weight 40, since in addition to the usual fixation by means of the clamp 5 the metallic body 4c will be magnetically fixed to the flange 1 by the layer 4b in addition to the usual fixation by the clamp 5.

[46] Preferably, the balance weight 4 and the magnetic body 4c are ~~constituted by~~ made of lead with application of a, and the layer 4b is made of a ferromagnetic material. However, when the prohibition of use of lead for making balance weightweights goes into foreeeffect, the preferred material will be steel, by virtue because of its abundance, low cost and relatively high specific weight, or. Alternately, another material having characteristics similar to those of steel and compatibilitycompatible with the magnetizable layer can be used.

[47] Figure 5 discloses a second alternative embodiment of the balance weight 40', ~~wherein the using a clamp 5 having~~ has two layers, a. The first one layer 5a being constituted by is made of any material (preferably metallic), and at the second one layer 6a being constituted by is made of a magnetic material. The balance weight 40' will be is fixed by means of the clamp in 5 using the procedure already commenteddescribed, in addition to the magnetic force applied by the second layer 6a close to near the free end 7 of figureFigure 1, thus strengthening the fixation of the balance weight 3040' to the wheel.

[48] Moreover, both the clamp 5 and the balance weight ~~[[4]]40 and 40'~~ may be jointly provided with a magnetizable layer 6a, and 4b, respectively, achieving an even more satisfactory result in fixing the balance weight 40, and 40', or else any other desired configuration may be foreseen. The balance weight 40, and 40' may be used on any wheel of the prior art, as well as on the preferred embodiment. ~~And the~~ The magnetized weight 4 of the preferred embodiment may be installed and used on the wheel of the prior art, ~~or on~~ any other type of wheel of an automotive vehicle, or ~~else on~~ any other necessary or desirable combination.

[49] The invention may be additionally used for balancing other wheels or substantially circular or non-circular bodies that are not compulsorily used for automotive vehicles.

[50] Examples of preferred embodiments having been described, it should be understood that the scope of protection of the present invention embraces other possible variations, being limited only by the contents of the accompanying claims, which include the possible equivalents.

[51] The foregoing description is only exemplary of the principles of the invention. Many modifications and variations are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than using the example embodiments which have been specifically described. For that reason the following claims should be studied to determine the true scope and content of this invention.